REMARKS

This patent application presently includes claims 22-42, of which claim 33 is allowed, claim 41 was objected to, but indicated as allowable if rewritten in independent form, and claims 22-32, 34-40 and 42 were rejected Claim 41 is rewritten independent form, claim 22 and 33 are rewritten to correct inadvertent errors, and claims 34, 36, 38 and 40 are amended to provide an antecedent basis for certain terms. All rejections are respectfully traversed.

Claims 22 and 33 were amended to insert "in that" after "characterized." This corrects an inadvertent omission when the claims were rewritten for the last amendment.

Claims 34, 36, and 40-41 were objected owing to the absence of an antecedent basis for certain terms. These claims have now been amended to introduce such antecedent basis or to obviate the need for it. Inasmuch as this is merely a response to an objection, these amendments were not made for a statutory purpose related to patentability.

Claims 22, 26-28, 37, and 39 were rejected as obvious over McMurtry, U.S. Patent No. 3,647,558 in view of Hall Jr. U.S. Patent No. 5,464,485 and Francis et al., U.S. Patent No. 4,356,271. This rejection is respectfully traversed. None of these references, nor any combination thereof renders the present claims obvious.

McMurtry, the primary reference utilized by the Examiner discloses a thermocouple protection tube in which the inner tube "comprises an elongated, impervious and a refractory oxide inner tube 12, preferably made of alumina" (column 2, lines 34-35). Such alumina tubes are used extensively in the industry as thermocouple protection tubes and are know by those skilled in the art to have low hot strength. Also, such protection tubes are fully pre-sintered and are quite expensive. Their use is typically limited to applications where the thermocouple must be manipulated frequently, as is the case with all molten metal applications. In contrast, the inner tube in accordance with the present invention is simply metallic and will bend when hot to accommodate the stresses of immersion in hot molten metal.

In McMurtry, the outer tuber 14 is metallic and the filler between the inner and outer tubes is "a slag resisting material 18, such as carbon impregnated magnesia grain (column 2, lines 40-42), filled by "pitch" (column 3, lines 16-18) and finally bonded by a "suitable resin such as liquid furfuryal alcohol polymer" (column 3, lines 25-27). Such a binder system will break down at a temperatures well below the sintering temperature of the refractory aggregate in the filler. As a result, all other fillers will become friable and lose their shape at temperatures in the range between 600°C and 800°C. if the outer sheath has been consumed, as is often the case, the filler will simply disappear.

In contrast to McMurtry, the filler in accordance with the present invention is a low temperature sintering refractory material including particulate borosilicate and boric acid powder . In this case, sintering occurs at only 780°C and shape integrity is maintained. Thus, unlike McMurtry (and unlike every other protection system known to the inventor), the thermocouple remains protected throughout the required temperature range. Regarding the composition of the filler in accordance with the present invention and the effect produced by borosilicate and boric acid powder, reference should be made generally to the description beginning at page 5, line 1 of the application.

Moreover, the Examiner admits that McMurtry does not disclose a refractory material with the claimed composition. She does, however, cite Francis, which discloses a ceramic foam, in one embodiment of which a mixture of bonding materials is used which contains calcium aluminate cement, boric acid powder, zinc borosilicate frit and hydrochloric acid. Francis describes the purpose of the bonding material as follows:

> The refractory made in accordance with the method of the present invention requires a bond which sets up rapidly enough to stabilize the foam to prevent collapse but not so rapidly as to prevent placement of the slurry in the desired mold. Additionally, the bond must be resistant to attack molten metal, salts or gasses with which it comes into contact.

Unquestionably, this is an entirely different purpose than the present invention.

Clearly, being related to a ceramic foam, Francis is not within the present inventor's field of endeavor. Furthermore, Francis deals with the problem of preventing a foam from collapsing, not with providing a durable insulation for a thermolcouple structure. Accordingly, Francis could not be said to be reasonably pertinent to the particular problem with which the present inventor was involved. In order to determine whether a prior art reference is not analagous and thus not relevant to determining obviousness, it must be determined (1) whether the reference is "within the field of the inventor's endeavor" and (2) if not, whether the reference is " reasonable pertinent to the particular problem with which the inventor was involved." *In re Deminski*, 796 F.2d 436, 230 U.S.P.Q. 2d 313 (Fed. Cir. 1986).

In as much as Francis meets neither of the two requirements set forth in *In re Deminski*, it is clearly nonanalogous art. "The combination of elements from nonanalagous sources, in a manner that reconstructs the applicant's invention only with the benefit of hindsight, is insufficient to present a *prima facie* case of obviousness." *In re Oetiker*, 977, F.2d 1443, 24 U.S.P.Q. 2d 1443 (Fed. Cir. 1992). This is clearly what the Examiner has done here. As a matter of law, the Examiner has failed to make out a *prima facie* case of obviousness in the present instance. Specifically, the Examiner has no basis for rejecting the structure set forth in claim 22. Claim 22 should therefore be allowed. Claims 26-28 and 37, and 39 depend from claim 22 and are believed to be allowable based upon their dependence from an allowable claim.

Claims 23-25, 29-32, 34, 36, 38 and 40 were rejected as obvious over McMurtry, Hall, Francis and further in view of Kilp. This rejection is respectfully traversed. None of the references, nor any combination thereof renders the present claims obvious.

The Examiner cited Kilp for its disclosure of a device having a protective shield for a thermoelectric device including two tubes with a refractory ceramic inserted between them.

Initially, it is noted that Kilp does not provide additional disclosure to cure the defects of McMurtry, Hall and Francis, in combination, as the basis for an obviousness rejection, as discussed above. On the contrary, the Examiner relies on that combination to formulate the combination

including Kilp. However, as explained above, the combination of McMurtry, Hall and Francis fails to provide a *prima facie* case of obviousness. Accordingly, the present rejection must fail as well for the same reason. Claims 23-25, 29-32, 34, 36, 38 and 40 are therefore allowable because they are dependent from an allowable claim.

Claims 35 and 42 were rejected as obvious over the combination of McMurtry, Hall, Francis, Kilp and AU 9712601. This rejection is respectfully traversed. Neither of these references, nor any combination thereof renders the present claims obvious.

This rejection relies upon the basic combination of McMurtry, Hall, Francis and Kilp which has been shown above to fail to provide a *prima facie* basis for obviousness. Moreover, AU 9712601 adds nothing to that combination that would cure the failure of McMurtry, Hall and Francis to provide a fundamental basis for obviousness. Accordingly, the present combination of references must also fail to make out a *prima facie* case of obviousness, and claims 35 and 42 are therefore allowable.

Claim 41 was objected to, but indicated as allowable if rewritten in independent form. This claims has been so rewritten without amendment and is therefore indicated as "previously presented." Claim 41 is essentially an original claim.

Applicant's attorney has made every effort to place this patent application in condition for allowance. It is therefore earnestly requested that this application, as a whole, receive favorable reconsideration and that all of the claims be allowed as presently constituted. Should there remain any under unanswered questions, the Examiner is requested to call the Applicant's attorney at the telephone number indicated below.

Dated: November 24, 2003

Respectfully submitted,

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